REMARKS

Claims 1, 4-7, 14-16, and 18-22 are in the application for further consideration. Claim 22 has been amended as suggested by the Examiner.

The present invention

The present invention is directed to the discovery that a small amount of metal powder added to a specific PFA, namely TFE/PEVE copolymer, not only adheres the copolymer to steel, but provides much better adhesion than when the PFA is the most common PFA, i.e. TFE/PPVE copolymer. This adhesion has value when the resulting composition is a rotolining composition and is claimed as such wherein the TFE/PEVE copolymer is in the form of spherical-like particles averaging 100 to 3000 μm in size. Only 0.2 to 2 wt% of the metal powder is present. Amounts greater than 1.2 wt% result in a diminishing of the adhesion and toughness of the lining (p. 7, l. 20-23). The adhesion is at least 25 lb/in in peel strength. The TFE/PEVE copolymer is fluorine exposure-stabilized to replace unstable end groups that decompose to cause bubbling during the melt formation of the rotolining (p. 5, l. 31-33) by the stable $-CF_3$ end group (p. 6, l. 5-7).

The prior art context of the present invention is that PFA rotolinings do not adhere to the mold surface against which they are formed. The high shrinkage of the PFA during cooling from the molten form causes the rotolining to separate from the mold surface (p. 1, last paragraph). Applicant's Example 1 confirms this result (p. 11, l. 11-14).

The present invention not only solves the problem of PFA rotolining not adhering to its mold surface, but does it very effectively by the discovery that the TFE/PEVE copolymer provides much better adhesion than the TFE/PPVE copolymer.

The prior art does not disclosure adherent PFA rotolining

None of the prior art cited discloses that it has solved the problem of PFA rotolining not adhering to its mold surface, much less providing a peel strength of at least 25 lb/in to the most common mold surface, steel.

The rejection refers to Kazumi expressly disclosing the desire to create a lining that adheres to the mold surface (D on p. 5), referring to [0003] to [0005] of Kazumi. There is no disclosure of such desire in Kazumi. Moreover, a disclosure of desire is not a disclosure of accomplishment.

Kazumi [0003] discloses that a pouch does not adhere to the interior surface of the vessel. The meaning of this observation is best understood by its context, wherein the vessel is shown in Kazumi Fig. 1, i.e. a large container with a narrow opening. The [0003] pouch would have to be stuffed through the narrow opening in order to be present in the interior of the vessel. One skilled in the art would recognize

that the pouch would then not conform to the interior surface of the vessel. Kazumi [0005] discloses that "in view of these problems" rotolining technology was proposed by the inventors. Rotolining provides a lining that does conform to the interior surface of the vessel. [0005] does not disclose that the rotolining adheres to the vessel wall, and indeed when the rotolining is PFA, it does not adhere to the surface upon which it is molded (as discussed above). The Kazumi invention described in the disclosure after [0005] says nothing about adhesion. In [0006] the problem to be solved is bubble formation in the fluororesin during rotolining. Addition of inorganic powder or metal powder to the fluororesin eliminates bubbles from the rotolining [0007], [0009], and [0011]. A powder-free topcoat (second resin layer) prevents the powder from depositing away from the rotolining [0010] and [0012].

Kazumi, read in the light of the prior art knowledge that PFA rotolining does not adhere to its mold surface, fails to solve this non-adhesion problem.

The prior art does not necessarily obtain the claimed peel strength of claim 1

The rejection mistakenly concludes that the prior art suggests the claimed composition, whereby the prior art composition necessarily obtains the claimed peel strength.

The fallacy in the stepwise analysis of concluding obviousness and then concluding inherency of result is apparent just by comparing the Kazumi disclosure with the composition of claim 1 that achieves the peel strength with just 0.2 to 2 wt% of metal powders that promote adhesion but do not themselves cause bubbling in the rotolining. Aluminum is a metal powder that cause such bubbling (p. 6, l. 27).

In contrast, Kazumi discloses that the powder to eliminate bubbling can be an inorganic powder or a metal powder, such as glass, silicon, zinc, aluminum, and copper [0007]. The amount of powder can be 0.1 to 30 wt%, and 5 wt% is the most effective amount for gas bubble removal [0018]. From this range of powder identities and amounts and the preference for 5 wt%, it cannot be concluded that Kazumi necessarily obtains a peel strength of at least 25 lb/in. As stated in MPEP §2112-IV:

> "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic."

The rejection also contains an internal contradiction of the conclusion that the peel strength of claim 1 is inherent in the prior art composition. Applicant's claimed composition is said to be an optimization of Kazumi (rejection, p. 3). Optimization

denotes difference from the Kazumi disclosure. This admission of difference is a denial that Kazumi inherently obtains the peel strength of claim 1.

Kazumi does not suggest the composition of claim 1

Kazumi does not disclose the TFE/PEVE copolymer recited in claim 1. The rejection asserts that PFA is the generic class to which PEVE belongs, without indicating any significance to this assertion. One skilled in the art reading Kazumi, without knowledge of the present invention, is not led to any conclusion that the PFA is TFE/PEVE copolymer. The Buckmaster references do not support such conclusion and in fact, lead away from it. Buckmaster '756 discloses that the PAVE comonomer contains 1 to 8 carbon atoms (col. 2, l. 3-5) and the PAVE used in the Examples is PPVE. Buckmaster et al. (Buckmaster) '668 discloses that the PAVE can be perfluoro(methyl vinyl ether), perfluoro(n-propyl vinyl ether), and perfluoro(n-heptyl vinyl ether) and mixtures thereof (p. 3, l. 17-18), and his Examples use TFE/PPVE copolymer.

With respect to the difference in powder amounts between Kazumi and claim 1, the rejection asserts (i) prima facia obviousness based on overlap with the 0.1 to 30 wt% Kazumi range and (ii) that the amount of metal powder is a result effective variable, making optimization obvious. It is not prima facia obvious from Kazumi that a 0.2 to 2 wt% of metal powder that does not cause bubbling will provide the peel strength recited in claim 1. The assertion of result effective variable is made without connection to any result. The result in Kazumi is elimination of bubbles in the rotolining. Kazumi does not teach any adhesion result, much less peel strength of at least 25 lb/in. The achievement of this minimum peel strength is not optimization of the bubble elimination teaching of Kazumi.

The rejection mentions that Kazumi discloses metal powder without further comment. The rejection ignores the Kazumi disclosure of the powder being an inorganic powder such as glass or silicon or that the metal powder can be aluminum, which Applicant found causes bubbles in the rotolining in the claimed composition amount. The fundamental error in the rejection is the obvious reliance on Applicant's disclosure to identify which Kazumi powder is relevant, which PFA (TFE/PEVE copolymer) should be used, and in which amount . Without knowledge of the present invention, one skilled in the art is not led to Applicant's combination of his metal powder in the 0.2 to 2 wt% amount together with TFE/PEVE copolymer to obtain the novel result of peel strength of at least 25 lb/in. This combination of compositional aspects recited in claim 1 indicate non-obviousness and therefore patentability of claim 1.

The secondary references relied upon for the rejection do not cure these shortcomings in the Kazumi disclosure.

Buckmaster '756 does not motivate the application of fluorine exposure stabilization to Kazumi to make the composition of claim 1

The discussion of compositional aspects of claim 1 above does not include the fluorine exposure stabilization of the TFE/PEVE copolymer, because Kazumi does not disclose this aspect. The rejection relies on Buckmaster '756 for this aspect. The rejection also asserts that Buckmaster '756 expressly teaches PEVE as suitable for copolymerization with TFE for a rotolining composition.

Buckmaster does not expressly teach the copolymerization of PEVE with TFE for any purpose much less as a rotolining composition. Buckmaster '756 discloses that the PAVE monomer has 1 to 8 carbon atoms (col. 2, l. 3-5). The rejection mistakenly refers to the alkyl group as containing 1-12 carbon atoms (Col. 3:top). The disclosure at col. 3:top refers to the R_1 substituent of a fluoroolefin at col. 1, l. 65 that is not a vinyl ether. The specific PAVE monomers disclosed are perfluoro(methyl vinyl ether), perfluoro(n-propyl vinyl ether), and perfluoro(n-heptyl vinyl ether) (col. 2, l. 49-53). The PAVE monomer used in the Examples is PPVE. These are the PAVE monomers that are expressly taught in Buckmaster '756, not PEVE. One skilled in the art reading Kazumi and Buckmaster '756 without knowledge of the present invention is not taught that the PAVE of choice in Buckmaster is PEVE and that this PEVE should be used to form the PFA of Kazumi, when neither reference discloses PEVE.

With respect to the fluorine exposure stabilization disclosed in Buckmaster '756, Buckmaster discloses that unstable end groups have the following effect upon the TFE/PAVE copolymer:

> "They have a tendency to cause bubbles or voids upon melt fabrication.: (col. 4, l. 40-41)

Thus, the adverse effect of the unstable end groups arises when the copolymer is in the molten state as occurs during melt fabrication. The effect of the fluorine treatment of the copolymer is to reduce or eliminate the unstable end groups (col. 4, l. 46-48). This elimination of unstable end groups eliminates bubbles upon melt fabrication. Buckmaster '668 discloses this effect in the table at the bottom of p. 9, namely that the fluorinated copolymer (TFE/PPVE) gives bubble-free rotomoldings.

Kazumi already prevents bubbles from being in the lining by addition of fine powder to the PFA. There is no motivation to apply the fluorine stabilization of

Buckmaster '756 to Kazumi to solve the bubble problem already solved by Kazumi. The Supreme Court in KSR International Co. v. Teleflex Inc, 82 USPQ2d 1385 (Sup. Ct. 2007) highlights the importance of common sense in the conduct of the patent examination process in the following statement

> "The Court of Appeals, finally drew the wrong conclusion from the risk of courts and patent examiners falling prey to hindsight bias. A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautions of arguments reliant upon ex post reasoning…….Rigid preventive rules that deny factfinders recourse to common sense, however, are neither necessary under our case law nor inconsistent with it." (p. 1397)

In both Ex parte Green, Appeal no. 2007-1271 and Ex parte Rinkevich and Garrison, Appeal 2007-1317, the Board of Patent Appeals and Interferences citing the KSR recourse to common sense concluded that the combining of references to solve a problem already solved by one of the references failed the common sense test, i.e. was not an obvious combination to one skilled in the art. As in Green and Rinkevich and Garrison, it is not obvious to one skilled in the art to combine Buckmaster '756 into Kazumi to prevent bubbles, when Kazumi has already solved the bubble problem.

The Examiner appears to agree with the non-obviousness of combining references to solve a problem already solved by one of the references in its treatment of the Wu/JP '593 rejection in the Office Action dated September 22, 2009, as follows:

> One of ordinary skill in the art would not have been motivated to add the metal particles of JP '593 to suppress bubbling in a method already disclosed as yielding bubble-free coating, since there is no evidence of further advantage arising from the synergy of the two." (p. 2)

This conclusion is fully applicable to the Kazumi/Buckmaster '756 combination of the present rejection.

The present rejection does not acknowledge its earlier agreement on non-obviousness. Instead, the present rejection on p. 4 recites two bases for the obviousness in importing the Buckmaster '756 fluorine treatment into Kazumi, namely that the copolymer is less prone to volatiles:

1. during further use.
2. during further processing, i.e. rotolining.

With respect to the "further use" under item 1, this is an open-ended expression, which is not disclosed in Buckmaster '756. Buckmaster '756, however, does disclose "during further end–use heat processing." (col. 2, l. 38) End-use processing of the copolymer is obviously its melt fabrication into the article desired, such as rotomolding. Indeed, it is during melt fabrication when the problem of bubbles arises if the copolymer contains unstable end groups, i.e. is not fluorine stabilized (col. 4, l. 40-41). These bubbles are the entrapment of volatiles evolving from the molten copolymer. There is no disclosure or hint in Buckmaster '756 that volatiles are evolved under any other circumstance. In other words, the "further use" under item 1 above is no different from item 2.

With respect to "further processing" under item 2 , first, the premise that this motivates the incorporation of the Buckmaster '756 fluorine stabilization into the making of the Kazumi rotolining is in conflict with Kazumi, making this an unobvious combination. Kazumi discloses the function of the fine powder in the molten resin, as follows:

> "In said resin lining, gas bubbles are formed in the molten PFA, but these bubbles adhere to the fine powder 6 which is freely moving through the PFA and are released to the outside." [0017]

According to this disclosure, the principle of operation of the fine powder is to move the bubbles to the surface of the PFA so that they will not be entrapped in the rotolining. If volatiles that form the bubbles are not present in the molten Kazumi rotolining, as would be the case for fluorine-treated copolymer of Buckmaster, then the Kazumi fine powder would have no function. It is not obvious to combine prior art that has the effect of changing the principle of operation of the prior art being modified (MPEP 2143.01). The rendering of the fine powder of Kazumi useless for its disclosed purpose is not an obvious modification. Second, Buckmaster '756 is all about bubble elimination, and as such, is not obviously applicable to Kazumi who has already solved this problem as discussed above. The rephrasing of this problem in the rejection as "less prone to volatiles" is a pretense that bubbles need not exist. It's the effect of volatiles causing bubbles, not just the existence of volatiles, that is the problem addressed in Buckmaster.

There is no motivation arising from Kazumi/Buckmaster '756 that the Buckmaster '756 fluorine stabilization treatment should be practiced on the Kazumi PFA., especially on TFE/PEVE copolymer that is not disclosed in either reference.

The Buckmaster '668 disclosure of particle size and sphere factor does not change the fact that Kazumi fails to suggest the composition of claim 1 and that Buckmaster '756 fails to motivate the application of fluorine exposure stabilization to Kazumi as discussed above.

Claims 4-7, 14-16, and 18-22

These claims are unobvious and therefore patentable on the same basis as claim 1 and on the additional basis of the subject matter recited in these dependent claims. While claim 1 recites a metal powder concentration range that is less than 6% of the fine powder concentration range disclosed in Kazumi, claim 14 recites an even narrower range that encompasses less than 3% of the Kazumi range. These relatively very small ranges, providing a different result than disclosed in Kazumi are indicative of unobviousness and therefore patentability.

Claims 5 and 15

These claims are unobvious and therefore patentable on the same basis as claim 1. Saito et al. (Saito) is cited as a tertiary reference in the Kazumi/Buckmaster '756/Buckmaster '668 combination as disclosing the addition of Sn to PFA to prevent it from bubbling, alleging this would be obviously applicable to prevent bubbling in Kazumi. The prevention of bubbling in Kazumi does not suggest either the claimed composition of the present invention that obtains a peel strength of at least 25 lb/in. or the application of Buckmaster '756 fluorine stabilization to the Kazumi PFA as discussed above.

In view of the foregoing, allowance of the above-referenced application is respectfully requested.

Respectfully submitted,

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